Indiana Course-Aligned Assessment
Pre-Calculus – Blueprint

Standard	Description	Percent Range *
1 – Relations and Functions	Students recognize and graph polynomial, rational, algebraic, and absolute value functions and use them to solve word problems. They understand the concepts of domain, range, intercept, zero, pole, asymptote, and point of discontinuity. They define and find inverse functions, describe symmetries of graphs, and apply transformations to functions. They understand the concept of defining a function parametrically and apply it to drawing graphs. They write equations of conic sections in standard form to find their geometric properties.	15-25%
2 – Logarithmic and Exponential Functions	Students solve word problems involving logarithmic and exponential functions. They draw and analyze graphs of logarithmic and exponential functions, including finding domain, range, intercepts, and asymptotes. They define and find inverse functions for both logarithmic and exponential functions.	5-15%
3 – Trigonometry in Triangles	Students understand how trigonometric functions relate to right triangles and solve word problems involving right and oblique triangles. They understand and apply the laws of sines and cosines. They use trigonometry to find the area of a triangle from two sides and the included angle.	3-13%
4 – Trigonometric Functions	Students extend the definitions of the trigonometric functions beyond right triangles using the unit circle and they measure angles in radians as well as degrees. They draw and analyze graphs of trigonometric functions (including finding period, amplitude, and phase shift) and use them to solve word problems. They define and graph inverse trigonometric functions and find values of both trigonometric and inverse trigonometric functions. They also relate the slope of a line to the tangent of the angle the line makes with the x-axis.	20-30%
5 – Trigonometric Identities and Equations	Students know basic trigonometric identities derived from the definitions and use them to prove other results. In particular, they understand and use the addition, double-angle, and half-angle formulas. They solve trigonometric equations and apply the equations to word problems.	8-18%
6 – Polar Coordinates and Complex Numbers	Students define and use polar coordinates, understanding their relationship with Cartesian coordinates. They translate equations in Cartesian coordinates into polar coordinates and graph equations in the polar coordinate plane. They understand complex numbers and convert them to trigonometric form. They multiply complex numbers in trigonometric form and prove and use De Moivre's Theorem.	5-15%
7 – Sequences and Series	Students prove the formulas for the sums of arithmetic series and for finite and infinite geometric series, using summation notation and applying the results to word problems. They understand the concept of recursion and define sequences using it. They develop the concept of the limit of a sequence or a function and apply it to problems of convergence and divergence.	5-15%
8 – Data Analysis	Students understand the median fit and least squares regression methods and apply them to linear modeling. They calculate and interpret correlation coefficients, using them to evaluate lines of best fit. They model data with various nonlinear functions, such as quadratic, exponential, and power functions.	3-10%
9 – Mathematical Reasoning and Problem Solving	In a general sense, mathematics is problem solving. In all of their mathematics, students use problem-solving skills: they choose how to approach a problem, they explain their reasoning, and they check their results. At this level, students apply these skills to justifying the steps in simplifying functions and solving equations and to deciding whether algebraic statements are true. They also learn how to use the mathematical induction to prove results.	**

* This range represents the approximate emphasis for each standard on the assessment.

** All test questions address Standard 9; however, all questions are mapped to a specific content area in Standards 1 – 8. Problem Solving should be taught in connection with content.